



WOOD (E.S.)

# RENAL ALBUMINURIA

*NOT DUE TO ORGANIC DISEASE OF THE  
KIDNEYS.*

BY

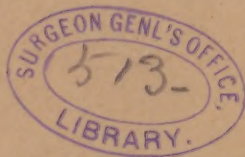
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## RENAL ALBUMINURIA NOT DUE TO ORGANIC DISEASE OF THE KIDNEYS.<sup>1</sup>

BY EDWARD S. WOOD, M.D.,

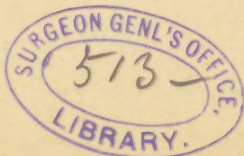
*Professor of Chemistry in Harvard Medical School.*

It has been my experience during the last twenty years to examine the urine in numerous cases of transient albuminuria of renal origin, as shown by the presence in the sediment of renal casts. In most of these it has naturally been impossible to follow out the cases to the complete disappearance of the albumin and casts, since most patients do not have an examination of the urine made after they feel that recovery has taken place. In very many of them, however, I have been able to make repeated examinations, and have known the albumin and casts to disappear, even in some cases which had been pronounced to be those of chronic Bright's disease.

Transient albuminuria is exceedingly common, and frequently occurs in persons who are apparently in perfect health, so that it often happens that it is only detected when an application is made for a policy in some life insurance company. In many cases the diagnosis of Bright's disease is made intentionally or accidentally; and it is to the recovery of such cases after taking some of the so-called "kidney cures," that these nostrums have obtained their popularity.

I do not propose to consider all of the causes of albuminuria included in the above title, since most of them are so universally recognized, and have been so well treated of in other places, that they are always

<sup>1</sup> Read at the Boston Society for Medical Observation, February 1, 1892.



borne in mind, and there is no danger of their being overlooked in cases in which traces of albumin are found in the urine. I refer, for instance, to the familiar classes of cases, in which transient albuminuria accompanies ordinary acute febrile diseases with high temperature (one exceptional class of cases will be mentioned), or cases of permanent albuminuria due to organic diseases which produce obstruction to the venous circulation, such as organic heart and liver diseases, or abdominal tumors which exert pressure on the abdominal vessels. Nor, as the title of my paper implies, shall I refer to renal albuminuria due to organic disease of the kidneys, nor to non-renal albuminuria, such as is due to hæmorrhage or suppuration caused by diseases of the urinary mucous membranes below the kidneys, or of the genito-urinary membranes.

The cases which I do wish to consider are those due to causes which, although generally recognized, are not so apt to be borne in mind, and those in which, when the quantity of albumin reaches a decided trace, an erroneous diagnosis is liable to be made.

I think we may consider that, clinically, all cases of renal albuminuria, not due to organic disease of the kidneys, may be arranged in one of the three following classes:

I. Those due to some general disease or disturbance (not renal) which causes some change in the renal circulation.

II. Those due to irritation of the kidneys, which irritation may be general, as in the case of the chemical (or dissolved) irritants, or circumscribed, as in the case of some mechanical irritants, such as concretions in the substance of the kidneys.

III. Those due to some change in the composition of the blood.

The duration of the albuminuria naturally varies with the cause. It may be permanent, as when due to organic disease of some other organ, in which case the kidneys themselves may, after a long time, become affected with some form of organic disease, or it may be temporary, lasting for a longer or shorter time according to the cause.

I. In the first class, due to some interference with the renal circulation, we may include:

(1) The febrile albuminuria which is invariably seen in acute diseases attended with high temperature. In these cases the quantity of albumin is usually only the very slightest trace, which with the accompanying casts, entirely disappears as soon as, or very shortly after, convalescence begins. In rare cases in ordinary acute diseases the quantity of albumin may become quite large and the renal casts very numerous, so that from a single examination, it may be impossible to say whether acute nephritis has been superadded to the other febrile affection or not, as the following case will illustrate:

CASE I. A young adult male, suffering with typhoid fever.

December 29th. Urine had a specific gravity 1017. Quantity of albumin, large trace (nearly one-fourth per cent.). Sediment: free blood and renal epithelium; numerous hyaline, granular, blood and epithelial casts; an occasional fibrinous cast; and an occasional cast with a few oil-globules adherent.

December 30th. Quantity of urine, fifty-six fluid ounces, specific gravity, 1014. Albumin, slight trace. Character of the sediment the same as yesterday, except the number of casts decidedly smaller.

January 8th. Specific gravity, 1008. Albumin, very slight trace. Sediment: little free blood and renal epithelium; few hyaline and granular casts, some



with blood and renal cells adherent; many of the casts of large diameter.

January 18th. Specific gravity, 1019. Albumin, slightest possible trace. Sediment, less in quantity but of the same character as on the 8th.

January 29th. Specific gravity, 1014. Albumin, slightest possible trace. Sediment: very few hyaline and finely granular casts; few blood-globules; slight excess of renal cells.

March 5th. Specific gravity 1025. Albumin, absent. Sediment, amorphous urates and uric acid.

In this case the diagnosis of Bright's disease was actually made by one or more medical friends of the patient in another city, to whom my first analysis was shown.

I have met with a few of these exceptional cases of severe albuminuria occurring during the progress of ordinary febrile diseases, and it is interesting to note the rapidity with which the albumin diminishes to the very slightest trace. The quantity of albumin remains a large trace (from one-eighth to one-fourth per cent.) only for a day or two, then diminishes very rapidly to a very slight trace, but does not disappear entirely usually for several weeks, until the renal epithelium has been restored.

(2) Disturbances of the renal circulation due to nervous diseases, such as delirium tremens, acute mania, and the like. Albuminuria is so common in these cases that no illustrations are necessary.

(3) Passive hyperæmia of the kidneys, due to certain organic diseases of the heart and liver, to the pressure of abdominal tumors, etc.

(4) Almost any serious disease, wherever located, tends to produce secondary effects upon the kidneys, which result in albuminuria and the presence of casts in the sediment. These effects may be due to a

simple disturbance of the circulation from pressure, as in the case of some tumors, or through the action of the nervous system, or they may be due to the diminished or modified metabolism resulting in an increased formation of calcic oxalate or uric acid, which will locally irritate the kidneys when separated from the urine within the renal tubules. In all of these cases of renal albuminuria secondary to serious disease elsewhere, the quantitative analysis of the urine will show the diminution of the metabolism, which, other things being equal, will be in proportion to the gravity of the principal affection. In these cases the urine as a whole (the mixed twenty-four-hour urine) does not resemble that of any of the organic diseases of the kidney, although it is in some cases very difficult and sometimes impossible to diagnosticate them from an organic renal disease, if we only have a single specimen to examine.

(5) Albuminuria of adolescence. In this class is also usually arranged the albuminuria of adolescence, on the theory that there is at about the age of puberty, or a little earlier, a slight physiological hypertrophy of the heart. In my opinion, however, in many cases another element must be considered, namely, that of local renal irritation by a very concentrated condition of the urine, or by the separation of crystalline substances (particularly uric acid and calcic oxalate) from the urine within the renal tubules.

The following cases would usually be classed among cases of albuminuria of adolescence:

CASE II. Female child, aged thirteen.

March 21st. Specific gravity 1023. Albumin, very slight trace. Sediment: an occasional hyaline, granular and epithelial cast; excess of renal cells; an occasional blood-globule, free and adherent to casts.

April 4th. Specific gravity 1027. Albumin, very

slight trace. Sediment: excess of renal cells; few blood-globules; an occasional small hyaline cast mostly with renal cells and blood-globules adherent; uric acid and calcic oxalate crystals.

April 11th. Specific gravity 1015. Albumin, very slight trace. Sediment: few blood-globules; an occasional hyaline cast.

May 1st. Specific gravity 1008. Albumin, slightest possible trace. Sediment: an occasional blood-globule; vaginal epithelium; no casts detected.

May 6th. Specific gravity 1010½. Albumin, slightest possible trace. Sediment: an occasional blood-globule and renal cell; no casts detected.

June 7th. Specific gravity 1018. Albumin, very slight trace. Sediment: little calcic oxalate and an occasional hyaline cast, and blood-globule.

January 29th. Specific gravity 1021. Albumin, absent. Sediment: nothing abnormal.

CASE III. Boy, aged thirteen.

February 20, 1885. Specific gravity 1017½. Albumin, very slight trace. Sediment: little blood; excess of renal cells; an occasional granular cast.

February 27th. Specific gravity 1022. Albumin, very slight trace. Sediment: little blood; excess of renal cells; hyaline and finely granular casts, mostly with blood and renal cells adherent.

April 16th. Specific gravity 1013. Albumin, very slight trace. Sediment: hyaline and granular casts, of medium diameter, some with granular renal cells adherent.

April 25th. Specific gravity 1017½. Albumin, slight trace. Sediment: numerous hyaline casts, with renal cells adherent; uric acid. The casts mostly of medium diameter.

July 21st. (Fever turn.) Specific gravity 1025. Albumin trace. Sediment: uric acid; calcic oxalate;



few hyaline casts; an occasional epithelial and blood cast. The casts of medium and large diameter.

November 12th. Specific gravity 1025. Albumin, trace. Sediment: calcic oxalate; hyaline casts, mostly large, and some with renal cells adherent; free granular renal epithelium.

August 10, 1886. Specific gravity 1024. Albumin, very slight trace. Sediment: little blood; calcic oxalate; an occasional large hyaline cast with renal cells and blood adherent.

October 8th. Specific gravity 1030. Albumin, absent. Sediment: amorphous urates; little calcic oxalate.

February 2, 1887. Specific gravity 1020. Albumin, very slight trace. Sediment: calcic oxalate; little blood and excess of renal epithelium; an occasional hyaline and finely granular cast with blood and renal cells adherent; an occasional calcic oxalate cast.

July 16th. Specific gravity 1022. Albumin, absent. Sediment, nothing abnormal.

January 7, 1888. Specific gravity 1025½. Albumin, absent. Sediment, uric acid.

July 29, 1890. Specific gravity 1025. Albumin, slightest possible trace. Sediment: calcic oxalate; an excess of renal cells; an occasional blood-globule; an occasional hyaline cast with few blood-globules and renal cells adherent.

August 5th. Specific gravity 1020. Albumin, slightest possible trace. Sediment, same as July 29th.

August 25th. Specific gravity 1020. Albumin, absent. Sediment, nothing abnormal.

February 13, 1891. Specific gravity 1028. Albumin, absent. Sediment, nothing abnormal.

(6) Normal albuminuria, so-called, or the albuminuria which appears in perfectly healthy individuals at certain times, such as after strenuous exertion, as in

the case of soldiers after a fatiguing march, is also naturally arranged in this class. In these cases, the albuminuria lasts for an hour or two only, and, so far as I know, is never accompanied with casts in the sediment.

## II. Renal irritation.

This class includes, I think, by far the largest number of cases, since it may be produced by so many different causes, and is so frequently seen in persons apparently in perfect health. It is in these cases most frequently that the albuminuria is first discovered by the life insurance examiner, since the patient, as a rule, has no other reason for consulting a physician, or having his urine examined.

Renal irritation may, according to the cause which produces it, be very mild, and last for a very long time before it is detected and its cause removed, or it may be very severe, producing a catarrhal nephritis, which may become a regular acute nephritis.

The most common causes of renal irritation are: (1) a very concentrated condition of the urine. (2) The action of chemical (or dissolved) irritants, which include some of the abnormal constituents of the urine, (*a*) sugar, (*b*) bile, (*c*) the irritating products of scarlatina, diphtheria, and the like, and (*d*) numerous irritating drugs and poisons, such as cantharides, arsenic, salicylic acid, salol, and many others. (3) Mechanical irritants, such as crystals and concretions of uric acid, urates, calcic oxalate, cystin, etc. We often see two or more of these causes acting at the same time. Especially are we apt to have a very concentrated condition of the urine associated with one or more of the other irritants.

(1) Concentrated urine may be caused by errors in diet, both of omission and commission, and if a person *habitually* possess a very concentrated urine, he is apt

to have albuminuria accompanied by renal casts in the sediment. I see this form of renal albuminuria in apparently healthy persons more commonly than any other. Very frequently my students consult me about themselves, they having detected albumin while testing their own urine in the laboratory, and I usually find that the students having albuminuria are habitually passing only about 800 or 900 cubic centimetres of urine of a specific gravity of 1028 to 1032. In those cases where I have made an examination of the sediment I have found a few casts, an excess of renal cells, and a few blood-globules both free and on the casts. This condition may be brought about by drinking too little — a habit which is easily acquired — or by over-eating and, at the same time, not taking enough water to properly dissolve the products formed, thereby over-working and irritating the kidneys.

The following cases will illustrate this form of albuminuria:

**CASE IV.** May 7, 1889. Specific gravity 1034. Albumin, slightest possible trace. Sediment: large excess of mucus; an occasional blood-globule; excess of renal cells, some of which are slightly fatty; an occasional hyaline and granular cast, most of which have an occasional renal cell, blood and oil globule adherent.

**CASE V.** Adult male. "Frequent micturition."

December 2d. Specific gravity 1029. Albumin, very slight trace. Sediment: excess of renal cells; few blood-globules; an occasional small hyaline cast with blood globules and renal cells adherent.

**CASE VI.** Rejected by life insurance examiner.

April 3d. Specific gravity 1030. Albumin, slightest possible trace. Sediment: excess of renal cells; few blood-globules; few casts, mostly of small diameter and with blood and renal cells adherent.

**CASE VII.** Male adult.

May 26, 1888. Specific gravity 1026. Albumin, very slight trace. Sediment: slight excess of renal cells; few blood-globules; an occasional hyaline and granular cast, some with blood and renal cells adherent.

November 8, 1889. Specific gravity 1027. Albumin, slightest possible trace. Sediment: excess of renal cells; an occasional small hyaline cast with renal cells adherent.

May 30, 1891. Specific gravity 1027. No albumin or casts.

As is well known, such a concentrated condition of the urine favors the deposition of crystalline sediments, which, if the separation occurs within the tubules, adds mechanical irritation to that of the concentrated urine, as the following case shows:

#### CASE VIII. Male adult.

March 12th. Specific gravity 1022. Albumin, slight trace. Sediment: calcic oxalate; acid sodium urate; an occasional finely granular cast; spermatozoa.

March 25th. Specific gravity 1016. Albumin, slight trace. Sediment: an occasional blood-globule, only one cast with blood, and renal cells detected after prolonged search.

June 28th. Specific gravity 1026½. Albumin, slightest possible trace. Sediment: spermatozoa, prostatic shreds; few blood-globules. No casts.

October 5th. Specific gravity 1027. Albumin, slightest possible trace. Sediment: prostatic shreds; an occasional blood-globule; spermatozoa. No casts.

October 25th. Specific gravity 1015. Albumin, absent. Sediment, only a few secondary calcic oxalate crystals.

In all cases in which the renal irritation is chiefly due to concentrated urine, it soon subsides on diluting the urine to the normal quantity and specific gravity, and the albumin and casts gradually disappear.



## (2) Chemical irritants.

(a) A urine containing a large percentage of sugar probably acts in the same way as a concentrated urine in producing renal irritation. The following case illustrates this :

### CASE IX. Adult, male.

November 5, 1888. Specific gravity, 1033. Sugar,  $6\frac{2}{3}$  per cent. Albumin, very slight trace. Sediment : excess of renal cells ; an occasional blood-globule ; few hyaline casts, some with blood and renal cells adherent.

May 24, 1889. Specific gravity, 1043. Sugar 11.4 per cent. Albumin, very slight trace. Sediment : same as above, and also few uric acid and calcic oxalate crystals.

May 25th. Specific gravity, 1037. Sugar, 7.7 per cent. Albumin and sediment, same as last examination.

June 17th. Specific gravity, 1028. Sugar, trace. Albumin, absent. Sediment, uric acid and spores.

June 20th. Specific gravity, 1023. Sugar, trace. No albumin or abnormal sediment.

October 1st. Specific gravity, 1023 $\frac{1}{2}$ . No sugar, albumin or abnormal sediment.

The following year, owing to neglect in diet, both the sugar and renal irritation reappeared.

(b) Jaundiced urine of more than a few days duration always produces more or less irritation of the kidneys. I have never examined a jaundiced urine, even in cases of simple catarrhal duodenitis, which had lasted for more than a few days without being able to detect a slight trace of albumin, and in the sediment, renal cells stained with bile-pigment, a few blood-globules, and casts with renal cells and blood adherent. If the jaundice be prolonged for a long time, it may produce marked pathological changes in

the kidneys, as in one case in which the jaundice was due to a malignant growth of the pancreas, which gradually encroached upon the bile-duct. The urine was perfectly free from albumin and casts before the jaundice; these appeared in the urine, however, a few days after the patient became jaundiced, and continued until death, which occurred some weeks later. On examination of the kidneys after death, Dr. W. W. Gannett found a glomerulo-nephritis.

(c) The albuminuria of scarlatina, and the like, need only to be mentioned.

(d) The following cases illustrate renal irritation due to some of the more common drugs and poisons:

CASE X. Male adult, three weeks after a poisonous dose of arsenic.

March 2, 1891. Specific gravity, 1013. Albumin, slight trace. Sediment: excess of renal cells; few blood-globules; few hyaline and granular casts with blood and renal cells adherent.

CASE XI. Adult, female, three weeks after a poisonous dose of arsenic.

March 2, 1891. Specific gravity, 1014. Albumin, slight trace. Sediment: amorphous urates; uric acid; excess of renal cells some of which are fatty; hyaline, granular and epithelial casts, some with blood and oil globules adherent.

CASE XII. Adult, male, ten days after a poisonous dose of Paris green.

November 12, 1891. Specific gravity, 1029. Albumin, slightest possible trace. Sediment: excess of renal cells; an occasional blood-globule; an occasional hyaline cast with renal cells and blood adherent.

CASE XIII. Adult, female, after therapeutic use of bromide of arsenic.

March 27, 1890. Specific gravity, 1014. Albumin, slightest possible trace. Sediment: excess of

renal cells; an occasional blood-globule; an occasional small cast with few blood-globules and renal cells adherent. (Drug omitted.)

April 11th. Specific gravity, 1017. Albumin, slightest possible trace. Sediment: uric acid; an occasional blood-globule; an occasional hyaline and epithelial cast.

April 24th. Specific gravity, 1027. No albumin. No abnormal sediment.

May 8th. Specific gravity, 1016. No albumin. No abnormal sediment.

I have seen similar results after taking Fowler's solution.

CASE XIV. Adult, female, chronic arsenic poisoning.

March 17, 1890. Specific gravity, 1021. Albumin, slightest possible trace. Sediment: excess of renal cells; an occasional blood-globule; an occasional cast with blood and renal cells adherent.

March 6, 1891. Specific gravity, 1012. No albumin. No abnormal sediment.

I have seen numerous cases of renal irritation due to chronic arsenic poisoning.

CASE XV. After therapeutic use of salicylic acid.

February 10th. Specific gravity, 1019. Albumin, trace. Sediment: numerous hyaline, granular and epithelial casts; most of the casts have few adherent blood-globules; free renal cells and blood-globules.

CASE XVI. After therapeutic use of salol.

May 26th. Specific gravity, 1022. Color, black. Albumin, slight trace. Sediment: chiefly blood-globules; excess of renal cells; few brown, granular casts, some with blood and renal cells adherent.

(3) Mechanical irritants, of which the principal ones are uric acid and urates, calcic oxalate and cystin, act by being separated from the urine in crystalline

form within the renal tubules, the lining membrane of which they may irritate by their sharp angles and points. Aggregations of these crystals with mucus and blood may become lodged in the tubules, increase in size by the deposition upon their surface of other crystals mixed with blood, mucus and *débris* of cells, and thus form a renal concretion, which may cause a permanent circumscribed irritation or inflammation, and consequently permanent albuminuria. This form of albuminuria requires no illustrative cases.

III. Blood diseases. The albuminuria due to changes in the composition of the blood is also accompanied by the presence of renal casts in the sediment. These are almost always pure hyaline in their character, unless the blood-pigment is also separated by the kidneys, in which case we find in the sediment brown granular casts and brown amorphous matter, as in cases of hæmoglobinuria.

I have by no means attempted to exhaust the list of the causes of renal albuminuria, but merely to call attention to some of the very common ones, most of which are readily amenable to treatment, and which so frequently fall into the hands of charlatans who pronounce the case one of Bright's disease.







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